

said motor rotor is disposed being hermetically isolated from a space wherein said motor stator is disposed;

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wherein said displacement measuring means comprises a resolver rotor made of a mass of magnetic metal material, disposed at a side of said motor rotor, and [including] includes a salient tooth cut from said mass of magnetic metal material; and a resolver stator including a detection coil magnetic pole and disposed at a side of said motor stator.

In claim 9, line 2, change "rotor" to --stator--.

In claim 11, line 2, change "rotor stator" to --motor rotor--.

In claim 20, line 2, change "rotor" to --stator--.

In claim 22, line 2, change "rotor stator" to --motor rotor--.

REMARKS

Claims 2-25 are all the claims pending in the application. Reconsideration and allowance of all the claims are respectfully requested in view of the following remarks.

Claim Rejections - 35 USC § 103

The Office Action rejects claims 2, 5, 7, 11-12, and 14-15 under 35 USC § 103(a) as being unpatentable over JPA 3-150041 (hereinafter JPA '041) in view of US Patent 5,446,966 to Ishizaki (hereinafter Ishizaki) and US Patent 5,291,087 to Pollick et al. (hereinafter Pollick). Applicants respectfully traverse this rejection for the following reasons.

The references fail to establish *prima facie* obviousness. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). All words in a claim must be

considered in judging the patentability of that claim against the prior art. *In re Wilson*, 424 F.2d 1382, 165 USPQ 494, 496 (CCPA 1970).

Claims 2 and 7 set forth a sealed actuator which includes, *inter alia*, a motor stator, housings to which the motor stator is attached, a motor rotor, bearings for rotatably supporting a rotation shaft, displacement measuring means for measuring displacement of the motor rotor, a hermetically sealing partition wall made of a nonmagnetic material and disposed at the gap between the stator and the rotor, wherein the displacement measuring means comprises a resolver rotor made of a mass of magnetic metal material, disposed at a side of the motor rotor, and includes a salient tooth cut from the mass of magnetic metal material, and a resolver stator including a detection coil magnetic pole which is disposed at a side of the motor stator.

Thus, Applicants' resolver rotor is made of a mass of magnetic metal material, and a salient tooth is cut from the mass of magnetic metal material. With such a configuration, the surface area is reduced to such a degree that it is possible to use the resolver rotor in a vacuum. In contrast, when a rotor is made of laminated steel plate, the surface area is increased, making it less suitable for use in a vacuum. See, for example, page 28 of the specification, lines 15-23.

As recognized by the Office Action, JPA '041 does not disclose a resolver with a salient pole, and reinforcing means. Ishizaki and Pollick do not cure the deficiencies of JPA '041.

The Office Action asserts that Ishizaki teaches a resolver with a salient pole rotor (10). However, in contrast to the present invention, the salient pole rotor (10) of Ishizaki is formed by "a stack of rotor laminations". See column 1, lines 59-60. Thus, Ishizaki does not disclose, teach or suggest at least a resolver rotor which is made of a mass of magnetic metal material, and which includes a salient tooth cut from the mass of magnetic metal material, as claimed by Applicants.

Further, Pollick does not cure the deficiencies of JPA '041 and Ishizaki. Pollick was cited by the Office Action merely as teaching the use of a sealed actuator with the stator mounted in a housing which surrounds the rotor. Pollick does not disclose, teach, or even remotely suggest a resolver rotor having a salient tooth at all, let alone one which is made of a mass of magnetic material, as claimed by Applicants.

Claims 2 and 7 are therefore allowable over JPA '041 in view of Ishizaki and Pollick. Claims 5 and 11-12 depend from claims 2 and 7, respectively, and thus are allowable for at least the same reasons as set forth with respect to claims 2 and 7. However, Applicants respectfully traverse this rejection as it applies to claim 5 and 12 for the following additional reasons.

Each claim 5 and claim 12 sets forth, *inter alia* and in addition to that in claims 2 and 7 respectively, a magnetic shield plate made of a magnetic metal material disposed between the stator magnetic pole of the motor stator and the detection coil magnetic pole of the resolver stator.

In contrast, JPA '041 fails to disclose a magnetic shield plate, **made of a magnetic metal** material, which is disposed between the stator magnetic pole of the motor stator and the detection coil magnetic pole of the resolver stator. Although the Office Action cites to element (31) as being a shield member, there is no disclosure that such member is made of a magnetic metal material. Again, neither Ishizaki nor Pollick cures the deficiencies of JPA '041. Ishizaki is only concerned with the resolver itself, and does not disclose, teach or suggest a shield plate at all. Pollick does not disclose, teach, or even remotely suggest a resolver and thus no magnetic shield plate at all, let alone one made of a magnetic metal, as claimed by Applicants.

Claim 14 sets forth a sealed actuator which includes, *inter alia*, a motor stator, housings to which the motor stator is attached, a motor rotor, bearings for rotatably supporting a rotation shaft, displacement measuring means for measuring displacement of the motor rotor, a hermetically

sealing partition wall made of a nonmagnetic material and disposed at the gap between the stator and the rotor, and reinforcing means for reinforcing at least a part of the hermetically sealing partition wall, wherein the reinforcing means are made of substantially the same nonmagnetic metal material as the partition wall.

In contrast JPA '041 does not disclose at least reinforcing means which are made of substantially the same nonmagnetic metal material as a partition wall. Ishizaki and Pollick do not cure the deficiencies of JPA '041.

Ishizaki deals only with the resolver itself. Ishizaki does not disclose, teach or suggest a hermetically sealing partition wall at all, let alone reinforcing means, as claimed by Applicants.

Pollick does not disclose, teach, or even remotely suggest a reinforcing means for reinforcing at least a part of his hermetically sealing partition wall (4) wherein the reinforcing means is made of the same nonmagnetic metal material as the partition wall, as claimed by Applicants. Although the Office Action asserts that elements (5) and (16) of Pollick constitute a reinforcing means, neither element is made of the same nonmagnetic material as the partition wall (4). Partition wall (4) is made of Hostalloy N, whereas back-up rings (5) are merely disclosed as being made of metal. See column 2, lines 31-33, and 22-23. Further, potting material (16) is disclosed as being plastic. See column 2, line 24. therefore, Pollick does not disclose, teach or suggest reinforcing means made of substantially the same nonmagnetic metal material as a partition wall, as claimed by Applicants.

Claim 14 is therefore allowable over JPA '041 in view of Ishizaki and Pollick. Claim 15 depends from claim 14 and is thus allowable over JPA '041 in view of Pollick for at least the same reasons as set forth for claim 14.

The Office Action rejects claims 3-4, 6, 8-9, and 13, under 35 USC § 103(a) as being unpatentable over Japan '041 in view of Ishizaki, Pollick and further in view of US Patent 4,893,078 to Auchterlonie (hereinafter Auchterlonie). Applicants respectfully traverse this rejection for the following reasons.

First, Applicants respectfully submit that the Office Action's statement "Japan '041, Ishizaki and Pollick disclose the sealed actuator essentially as claimed" is wrong. As set forth above with respect to claims 2 and 7, Japan '041, Ishizaki and Pollick are deficient. Further, Auchterlonie does not cure the deficiencies of JPA '041, Ishizaki and Pollick. Auchterlonie is cited merely for its alleged teaching of a differential circuit type resolver to determine absolute position of a moving body, and that such resolver can be mounted on a non-magnetic member to increase the accuracy thereof. However, Auchterlonie does not disclose, teach, or even remotely suggest a resolver rotor, which includes a salient tooth, cut from a mass of magnetic metal material. Therefore, *arguendo*, even if one of ordinary skill in the art were motivated to combine Auchterlonie with JPA '041, Ishizaki and Pollick as suggested by the Office Action, any such combination would still not render Applicants' claims unpatentable.

With respect to claim 3, the references fail to establish *prima facie* obviousness by a preponderance of the evidence. Yet, to establish *prima facie* obviousness, the ultimate determination must be based on the entire record, by a preponderance of evidence. *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). The legal standard of "a preponderance of evidence" requires the evidence to be more convincing than the evidence which is offered in opposition to it. Under 35 USC § 103, the examiner must provide evidence which as a whole shows that the legal determination sought to be proved (i.e., the reference teachings establish a *prima facie* case of obviousness) is more probable than not. See MPEP § 2142.

In the present case, Auchterlonie discloses that the support (31) is preferably an insulating material such as glass fiber reinforced plastic. However, Auchterlonie also discloses that ferromagnetic materials can be used in the case where high accuracy is not of prime importance. Thus, it is just as likely as not that one of ordinary skill in the art, following the teachings of Auchterlonie, would use a ferromagnetic material. One of ordinary skill in the art looking to improve JPA '041 by following the teachings of Auchterlonie would not be motivated, by a preponderance of the evidence, to use a nonmagnetic material over a material loaded with iron.

In contrast, the use of a nonmagnetic substance to mount the resolver rotor, as in claim 3 of the present invention, is important to prevent magnetic field from entering the resolver from the motor stack. If the magnetic field of the motor stack enters the resolver, then the resolver will not detect the correct position of the motor rotor.

Moreover, with respect to claim 4, Auchterlonie discloses a differential resolver which includes windings at both the moving side and the stator side. Thus, when the resolver of Auchterlonie is used in a vacuum (as in JPA '041) the winding of the moving side is exposed to the vacuum and a large amount of gas is generated. Accordingly, one of ordinary skill in the art would not be motivated to use Auchterlonie's resolver in JPA '041 which is in a vacuum environment.

In addition, Auchterlonie discloses no escaping portion for heat produced in the resolver winding of the moving side, so that the moving body is apt to be heated up to a high temperature. When used in a vacuum environment, as is JPA '041, it is difficult to dissipate heat without a heat escaping portion. In turn, the high temperature makes it difficult to keep positional accuracy. Thus, for these additional reasons, one of ordinary skill in the art would not be motivated to modify the actuator motor of JPA '041, which is in a vacuum environment, with the differential resolver of Auchterlonie which is unsuitable for a vacuum environment.

In contrast, the resolver of the present invention is such that a winding is provided only at the stator side. This arrangement eliminates the problem intrinsic to the resolver of Auchterlonie.

Further, *arguendo*, even if one of ordinary skill in the art were motivated to combine Auchterlonie with JPA '041, Ishizaki and Pollick as suggested by the Office Action, such would still not render the present invention unpatentable because the resolver of Auchterlonie is not the equivalent of that in the present invention.

The resolver of the present invention is of a differential type to cancel a magnetic field generated in the motor stack and introduced into the resolver. The resolver of the present invention is of a differential circuit type for the purpose of improving the S/N ratio. In contrast, the differential resolver of Auchterlonie is for positional detection with high accuracy. Such a differential resolver does not necessarily improve the S/N ratio by canceling a magnetic field. The resolvers are thus not equivalents.

Thus, for the above reasons, claims 3-4 are patentable over JPA '041 in view of Ishizaki, Pollick and further in view of Auchterlonie. Claims 6 and 13 contain similar limitations to those set forth in claims 3, 4, and 5. Applicants respectfully submit that claims 6 and 13 are allowable for at least the same reasons as set forth above with respect to claims 3-5. Claims 8 and 9 contain limitations similar to those set forth in claims 3 and 4, respectively, and are therefore allowable for at least the same reasons as set forth with respect to claims 3 and 4.

The Office Action rejects claim 10 under 35 USC § 103(a) as being unpatentable over JPA '041 in view of Ishizaki and Pollick and further in view of Anger. Applicants respectfully traverse this rejection for the following reasons.

First, Applicants respectfully submit that the Office Action's statement "Japan '041, Ishizaki and Pollick disclose the sealed actuator essentially as claimed" is wrong. As set forth above with

respect to claim 7, Japan '041, Ishizaki and Pollick are deficient. Further, Anger does not cure the deficiencies of JPA '041, Ishizaki and Pollick. Anger is cited merely for his alleged teaching of both a fine resolver and a coarse resolver to simultaneously determine both fine and coarse positions of the system. However, Anger does not disclose, teach, or even remotely suggest a resolver rotor, which includes a salient tooth cut from a mass of magnetic metal material, as claimed by Applicants. Therefore, *arguendo*, even if one of ordinary skill in the art were motivated to combine Anger with JPA '041, Ishizaki and Pollick as suggested by the Office Action, any such combination would still not render Applicants' claims unpatentable.

Further, Anger does not disclose, teach, or suggest the same arrangement of elements as set forth in Applicants' claim 10. According to the present invention, the structure of the coarse resolver (one pole/one rotation) and the fine resolver (multi-pole/one rotation) is a system which eliminates the necessity of returning to the origin to determine the position of the motor rotor. In contrast, the resolvers of Anger simultaneously determine a fine position and a rough position of the system. Anger's configuration does not eliminate the need to return to the origin to determine the position of the motor rotor, as does the configuration in the present invention. Thus, *arguendo*, even if one of ordinary skill in the art were motivated to combine Anger with JPA '041, Ishizaki and Pollick, as suggested by the Examiner, any such combination would still not include the equivalent of Applicants' claimed displacement measuring means.

The Office Action rejects claims 16-18, 22-23, and 25, under 35 USC § 103(a) as being unpatentable over JPA '041 in view of Ishizaki and Pollick and further in view of JPA 3-150042 (hereinafter JPA '042). Applicants respectfully traverse this rejection for the following reasons.

First, Applicants submit that the Office Action's interpretation of JPA '042 is wrong. JPA '042 contains no disclosure, teaching or suggestion whatsoever that a plurality of unit sealed actuators are coupled to form a single unit, as set forth in Applicants' claims 16-18.

Claims 16 and 18 set forth a plurality of unit sealed actuators connected in series to each other, **each** of the unit sealed actuators including, *inter alia*, a motor stator, a housing to which the motor stator is attached, a motor rotor including a rotor magnetic pole, and a hermetically sealing partition wall. Thus, for example, because the claims call for a plurality of unit sealed actuators, they include a plurality of motor rotors including a rotor magnetic poles, and a plurality of hermetically sealing partition walls.

In contrast to the present invention, JPA '042 includes only one motor rotor (12), and only one partition wall (31). Further, although JPA '042 discloses two stators (40,42), and two rotor magnetic poles (44), one stator (40) and one rotor magnetic pole (44) do not make up a unit sealed actuator connected in series to a second unit sealed actuator made of the other stator (42) and the other rotor magnetic pole (44). That is, the two stators and two rotor magnetic poles are intertwined with one another by the common use of one partition wall (31) and one motor rotor (12). Therefore, JPA '042 does not disclose, teach or suggest a plurality of unit sealed actuators connected in series to each other, as claimed by Applicants.

For the above reasons, claims 16-18 are patentable over JPA '041 in view of Ishizaki and Pollick and further in view of JPA '042. Claims 19-25 depend from claims 16-18 and are thus allowable for at least the same reasons as set forth with respect to claims 16-18. However, Applicants respectfully traverse this rejection as it applies to claims 23 and 25 for the following additional reasons.

Claim 23 sets forth, *inter alia*, the limitation that a magnetic shield plate is made of a magnetic metal material and is disposed between the stator magnetic pole of the motor stator and the detection coil magnetic pole of the resolver stator. This limitation is similar to that in claim 5. Thus, Applicants' arguments with respect to claim 5 are pertinent and are herein incorporated by reference.

Claim 25 sets forth, *inter alia*, the limitation that the rotation shaft of the motor rotor is an extension shaft fixed to the motor rotor. This limitation is not found in, taught, or even remotely suggested by any of the references of record.

The Office Action rejects claims 19-20 and 24 under 35 USC § 103(a) as being unpatentable over JPA '041 in view of Ishizaki, Pollick and JPA '042 and further in view of Auchterlonie. Applicants respectfully traverse this rejection for the following reasons.

First, Applicants respectfully submit that the Office Action's assertion "JPA '041, Ishizaki, Pollick and JPA '042 disclose the sealed actuator system essentially as claimed" is wrong. Claims 19-20 and 24 depend from claim 18. Applicants' arguments with respect to the deficiencies of JPA '041, Ishizaki, Pollick and JPA '042, in connection with claim 18, are pertinent and are herein incorporated by reference. Further, Auchterlonie was cited merely for his alleged teaching of a differential circuit type resolver to determine absolute position of a moving body, and that such resolver can be mounted on a non-magnetic member to increase the accuracy thereof. However, Auchterlonie does not disclose, teach, or even remotely suggest a plurality of unit sealed actuators connected in series to each other. Therefore, *arguendo*, even if one of ordinary skill in the art were motivated to combine Auchterlonie with JPA '041, Ishizaki, Pollick and JPA '042 as suggested by the Office Action, any such combination would still not render Applicants' claims unpatentable.

Additionally, with respect to claims 19 and 20, Auchterlonie is deficient a teaching of the claimed subject matter for the same reasons as set forth above with respect to claims 3 and 4 respectively. Therefore, Auchterlonie does not cure the deficiencies of JPA '041, Ishizaki, Pollick, and JPA '042. Further, claim 24 contains limitations similar to those in claims 3-5. Auchterlonie is also deficient a teaching of the subject matter of claim 24 for the same reasons as set forth above with respect to claims 3-5, and thus not cure the deficiencies of JPA '041, Ishizaki, Pollick, and JPA '042.

The Office Action rejects claim 21 under 35 USC § 103(a) as being unpatentable over JPA '041 in view of Ishizaki, Pollick and Japan '042 and further in view of Anger. Applicants respectfully traverse this rejection for the following reasons.

First, Applicants respectfully submit that the Office Action's assertion "JPA '041, Ishizaki, Pollick and JPA '042 disclose the sealed actuator system essentially as claimed" is wrong. Claim 21 depends from claim 18. Applicants' arguments with respect to the deficiencies of JPA '041, Ishizaki, Pollick and JPA '042, in connection with claim 18, are pertinent and are herein incorporated by reference. Further, Anger was cited merely for his alleged teaching of utilizing both a fine resolver and a coarse resolver. However, Anger does not disclose, teach, or even remotely suggest a plurality of unit sealed actuators connected in series to each other. Therefore, *arguendo*, even if one of ordinary skill in the art were motivated to combine Auchterlonie with JPA '041 Ishizaki, Pollick and JPA '042 as suggested by the Office Action, any such combination would still not render Applicants' claims unpatentable.

Additionally, claim 21 includes, *inter alia*, the limitation that the displacement measuring means includes a coarse resolver and a fine resolver. This limitation is similar to that in claim 10. Applicants' arguments with respect to the deficiencies of Anger's teaching, set forth above with

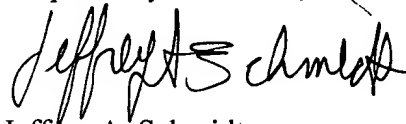
respect to the subject matter of claim 10, are thus pertinent here and are herein incorporated by reference. Therefore, Anger does not cure the deficiencies of JPA '041, Ishizaki, Pollick, and JPA '042.

Conclusion

In view of the above remarks, reconsideration and allowance of this application are now believed to be in order, and such action is hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the number listed below.

Applicant hereby petitions for any extension of time which may be required to maintain the pendency of this case. Any required fee, except for the Issue Fee, for such extension is to be charged to Deposit Account No. 19-4880.

Respectfully submitted,



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